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U S NAVAL PROVING GROUND
DAHLGREN VIRGINIA

REPORT NO 1153

BOMBS AND ASSOCIATED COMPONENTS

67th Partial Report

- -

COLD WEATHER TESTING OF FIN ASSEMBLIES TYPE EX 10 MOD 10 AND MK 83 MOD 1

FINAL Report

Copy No. 11

Task Assignment NPG Re3c-321-1-53

Classification CONFIDENTIAL SECURITY INFORMATION

Cold Weather Testing of Fin Assemblies Type Ex 10 Mod 10 and Mk 83 Mod 1

PART A

SYNOPSIS

1. This is a final report on the cold weather testing of the Type Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies.

2. This test was performed to determine the effects, if any, of low temperature on the assembly of the Type Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies.

3. It is concluded that:

a. The Type Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies can be assembled to their respective bomb bodies almost as fast at -65°F as they can at +73°F.

b. At low temperatures the method of attaching the Mk 83 Mod 1 Fin Assembly to a bomb is superior to that of the Ex 10 Mod 10 Fin Assembly.

c. The Ex 10 Mod 10 Fin Assembly is not as practicable for service use as the Mk 83 Mod 1.

Cold Weather Testing of Fin Assemblies
Type Ex 10 Mod 10 and Mk 83 Mod 1

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Cold Weather Testing of Fin Assemblies
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PART B

INTRODUCTION

1. AUTHORITY:

This test was conducted under Task Assignment NPG-Re3c-321-1-53 authorized by reference (a) and in accordance with enclosure (1) of reference (b).

2. REFERENCES:

a. BUORD Conf ltr NP9 Re3c-EEK:mp Ser 42777 of 29 Julv 1952
b. BUORD Conf ltr NP9 Re3c-RFG:hjk Ser 55275 of 15 April 1953
c. NPG Conf Report No. 1113 of 15 April 1953

3. BACKGROUND:

Assembly, catapult and drop tests have been conducted with the Fin Assembly, Type Ex 10 Mod 10A, and are the subject of reference (c).

4. OBJECT OF TEST:

The purpose of this test was to determine the effects, if any, of low temperature on the assembly of the Type Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies.

5. PERIOD OF TEST:

a.	Date of Project Letter	15 April 1953
b.	Date Material Received	7 April 1953
c.	Date Commenced Test	30 April 1953
d.	Date Completed Test	1 May 1953

Cold Weather Testing of Fin Assemblies
Type Ex 10 Mod 10 and Mk 83 Mod 1

PART C

DETAILS OF TEST

6. DESCRIPTION OF ITEM UNDER TEST:

The Ex 10 Mod 10 Fin Assembly used for this test was identical to the Ex 10 Mod 10A Fin Assembly reported in reference (c). The Ex 10 Mod 10 and the Mk 83 Mod 1 Fin Assemblies are identical in construction except for the method of attaching to the bomb body. The Ex 10 Mod 10 Fin Assembly utilizes a locking mechanism described in detail in reference (c), whereas the Mk 83 Mod 1 Fin Assembly is attached to the bomb body by means of six (6) Allen head set-screws. The Mk 83 Mod 1 fin assembly is for use on the Ex 10 Mod 15 bomb body.

7. DESCRIPTION OF TEST EQUIPMENT:

a. The cold weather test was performed in the Altitude Chamber of the Aviation Ordnance Department. This chamber is a standard Navy type, modified to permit firing through ports in one end. The main chamber is 12 feet in diameter and 18 feet in length on the inside. The actual floor working area that was free of other equipment was 18 feet by 5 feet. The air lock is seven (7) feet in diameter and six (6) feet in length with a door opening 56 inches in diameter. The temperature range for this chamber is from -67°F to ambient. The pressure range is from atmospheric to 1.7 p.s.i. (50,000 feet altitude). There is no humidity control.

b. To enter the cold chamber it was required that each individual wear the following standard Naval Aviation winter type clothing:

(1) Winter Flying Suits, wool backed, nylon, Stock No. R37-S-5349-42.

(2) Winter Flying Boots, Stock No. R37-B-4214.

(3) Face Masks, Knitted, Stock No. R37-M-143.

(4) Gloves, Intermediate, leather, five (5) finger type with wool inner lining, Stock Nos. R37-G-2505-30 and R37-G-2500-30.

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Type Ex 10 Mod 10 and Mk 83 Mod 1

8. PROCEDURE:

a. The Fin Assemblies, Type Ex 10 Mod 10 and Mk 83 Mod 1, were placed in the altitude Chamber simultaneously with their respective bomb bodies, the Ex 10 Mod 10 and Ex 10 Mod 15. The fin assemblies and bomb bodies were allowed to soak for four (4) hours at low temperature, the last two (2) hours of which were at -65°F.

b. Cold weather clothing of standard Naval Aviation winter issue was worn by each person in the Altitude Chamber. One (1) Aviation Ordnanceman, 2nd Class, and one (1) Civilian Battery Attendant, 2nd step, were the personnel used for the assembly test.

9. RESULTS AND DISCUSSION:

a. Subsequent to the four (4) hour soaking period, the assembly crew and cameramen entered the Altitude Chamber. The temperature was -64°F at the start of the test and had risen to -60°F by the end of the test. This was caused by the refrigeration equipment and the circulating fans being shut off during the test so that normal voice communications were audible.

b. Some difficulty was encountered during the low temperature test of the Ex 10 Mod 10 Fin Assembly. The fin assembly was mounted on the bomb with the indicator pins in the mount position and the connector pins on the fin assembly aligned with the receiving holes in the base plate of the bomb. When the assembly is in this position the rotation of knurled nuts should lock the connector pins in their respective receiving holes. The initial rotation of these knurled nuts could not be accomplished by hand because the locking mechanisms of the fin assembly had become fouled with frost and ice. Pressure was applied to the knurled nuts using a screw driver as a lever. It was necessary to rotate the knurled nuts 1/4 to 1/2 turn with the screw driver before they were sufficiently free to allow rotation by hand. The knurled nuts could then be rotated by hand 85 to 95 per cent of the full lock position. The screw driver, used as a lever, was required to attain the last 5 to 15 per cent of full lock position. Approximately four (4) minutes were required to secure the Ex 10 Mod 10 Fin Assembly to the Ex 10 Mod 10 Bomb. An assembly test conducted at ambient temperature with other conditions the same as above required 1 minute and 45 seconds for completion, and no difficulties were encountered.

c. The low temperature assembly test of the Mk 83 Mod 1 Fin Assembly presented no difficulties. The fin assembly was properly positioned and secured in approximately two (2) minutes. The six (6) set-screws worked freely and did not hinder operations. An assembly test conducted at ambient temperature with other conditions the same as at low temperature required 1 minute and 17 seconds for completion and no difficulties were encountered.

d. The Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies were removed from the Altitude Chamber and allowed to sweat until beaded with moisture. Figures 1 and 2 show the fin assemblies at different stages of the sweating period. Subsequent to the sweating period, they were returned to the Altitude Chamber and allowed to soak for two (2) hours at -63°F. Assembly tests were conducted at the termination of this soaking period and the same results were experienced as those stated in the preceding paragraphs.

PART D

CONCLUSIONS

10. It is concluded that:

a. The Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies can be assembled to their respective bomb bodies almost as fast at -65°F as they can at +73°F.

b. At low temperatures the method of attaching the Mk 83 Mod 1 Fin Assembly to a bomb is superior to that of the Ex 10 Mod 10 Fin Assembly.

c. The Ex 10 Mod 10 Fin Assembly is not as practicable for service use as the Mk 83 Mod 1.

Cold Weather Testing of Fin Assemblies
Type Ex 10 Mod 10 and Mk 83 Mod 1

- -

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CONFIDENTIAL

NPG REPORT NO. 1153

U. S. NAVAL PROVING GROUND
DAHLGREN, VIRGINIA

Sixty-seventh Partial Report

on

Bombs and Associated Components

- -

Final Report

on

Cold Weather Testing of Fin Assemblies

Type Ex 10 Mod 10 and Mk 83 Mod 1

Project No.: NPG-Re3c-321-1-53

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SECURITY INFORMATION

1 May 1953 SECURITY INFORMATION

Type Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies (the Mk 83 Mod 1 is on the left). Vertical view of fin assemblies immediately following their removal from the Altitude Chamber. (Note covering of frost).

Figure 1 APPENDIX A

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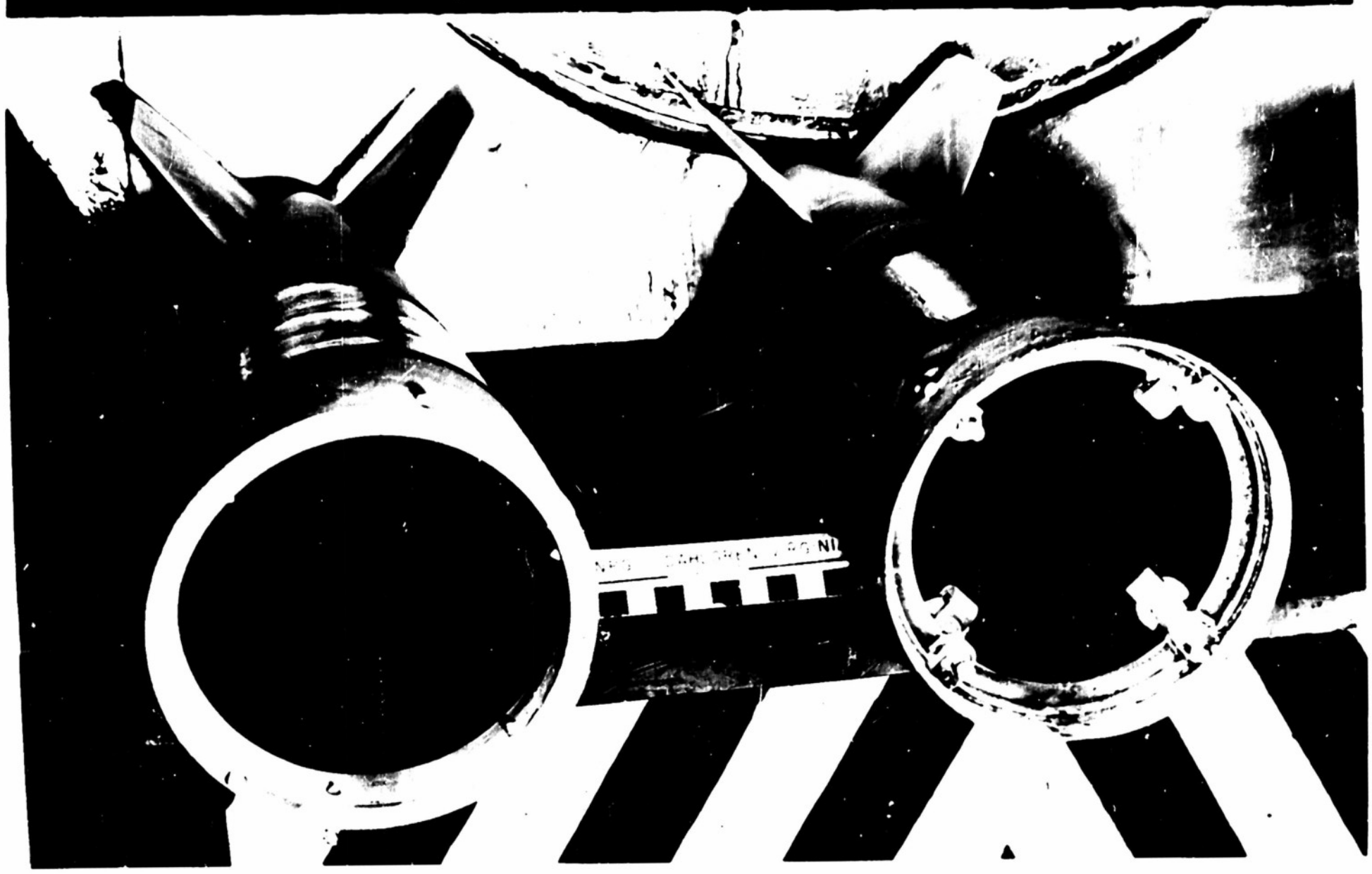
SECURITY INFORMATION

NP9-63510 1 May 1953

Type Ex 10 Mod 10 and Mk 83 Mod 1 Fin Assemblies (the Mk 83 Mod 1 is on the left). End view of fin assemblies five (5) minutes after removal from the Altitude Chamber. (Note extent of sweating).

Figure 2

APPENDIX A



Cold Weather Testing of Fin Assemblies
Type Ex 10 Mod 10 and Mk 83 Mod 1

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